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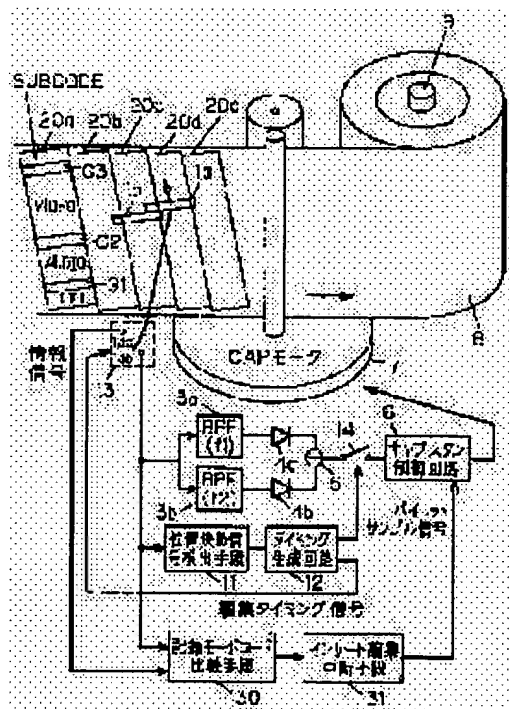
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(54) MAGNETIC RECORDING AND REPRODUCING DEVICE

(57)Abstract:

PURPOSE: To prevent deviation of recording in an editing area and a nonediting area at the time of insert editing for rewriting a part of a track.

CONSTITUTION: A recording mode code for showing a recording mode of its own track is recorded on a tape 8 in a track 20. At the insert editing time, a reference recording mode code annexed to an editing information signal and the reproduced recording mode code obtained by reproducing a noninsert editing area are compared with each other by a recording mode code comparing means 30. In response to the output of the comparing means 30, when the reference recording mode code and the reproduced recording mode code are deviated from each other, the insert editing is ended by an insert editing interrupting means 31.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the magnetic recorder and reproducing device which carries out record playback of an image, voice, the data, etc. at a tape.

[0002]

[Description of the Prior Art] The magnetic recorder and reproducing device through magnetic tapes, such as a video tape recorder (hereafter referred to as VTR), is put in practical use, and it has spread. Moreover, development of the miniaturization of the equipment by much more high density record and digitization is made in each company.

[0003] When performing especially digital recording, it is possible to divide the truck recorded on the tape and to take the configuration which records information, such as speech information and image information, separately. In that case, the want which edits speech information and image information independently respectively at the time of edit can be considered. An example of the conventional magnetic recorder and reproducing device in the case of performing such edit (it being hereafter called insert editing) is explained.

[0004] (Drawing 6) is an example of the truck block diagram on the tape recorded by the conventional magnetic recorder and reproducing device. A truck is classified from a gap G1 by G3, as shown in drawing. The insertion information field where the positioning information signal for positioning an editing point when performing the aforementioned insert editing from a head was embedded (ITI field), Four fields of the sub-code field (SUBCODE field) where information, such as an audio range (AUDIO field) on which the sound signal was recorded, a video field (VIDEO field) where the video signal was recorded, and a time code of each truck, was recorded are formed at the time of record. Moreover, in the top ITI field, multiplex record of the pilot signal for performing tracking control with a positioning information signal at the time of insert editing is carried out. In this case, two kinds of pilot signals recorded on different frequencies f1 and f2 show the example recorded by turns every one truck.

[0005] Actuation when you want to perform insert editing only for a video field in such a truck configuration is explained. A head carries out to a truck 40 being under scan. First, in the scan part of a truck head, it is made the playback mode and tracking control is performed using two pilot signals (frequencies f1 and f2) which leak from the ITI field of the adjoining trucks 41 and 42 of a horizontal-scanning truck as a cross talk. On the other hand, the positioning signal in an ITI field is detected and a truck datum reference signal is acquired. A new information signal is recorded at the same time it changes the mode from playback to record, it performs overwrite and it eliminates an information signal [finishing / record] based on this truck location reference signal, when directing the head of a video field.

[0006]

[Problem(s) to be Solved by the Invention] If the trend of current television is seen, in addition to the present NTSC broadcast, it will be expected that high-definition television broadcasting will spread quickly from now on. So, in the digital video tape recorder which is next-generation VTR, record

playback of the HDTV signal corresponding to Hi-Vision is needed besides record playback of the present NTSC signal. Naturally, VTR which can carry out record playback of an NTSC signal and the HDTV signal in combination is expected. It is expected that the section when the NTSC signal was written to the tape by which record playback was carried out with such a VTR at the low-speed rate, and the section when the HDTV signal was written at the high-speed rate are intermingled.

[0007] However, with the truck configuration by the conventional magnetic recorder and reproducing device [being above (drawing 6)], no information about the rate of the signal recorded on the truck is acquired from a truck to such a tape at the time of insert editing. Therefore, into insert editing, it is a high-speed record rate about the section of a low-speed record rate, or insert editing of the section of a high-speed record rate may be carried out to reverse at a low-speed rate. For example, insert editing of the VIDEO field is carried out at a high-speed rate, and what remains with record of a low-speed rate generates other fields. since the signal with which rates differ is recorded in the same truck even if it is going to reproduce this section next, normal playback cannot be performed at all -- things -- **

[0008] This invention solves the above-mentioned trouble, and when performing insert editing which rewrites some trucks, it aims at offering the magnetic recorder and reproducing device with which a record rate does not shift in an edit field and a non-edited field.

[0009]

[Means for Solving the Problem] In order to solve the above-mentioned trouble the magnetic recorder and reproducing device of this invention The 1st recording mode which records at least two or more fields on the slanting truck recorded on the magnetic tape, and makes one frame M (M is ten or more integers) of said truck, It has the 2nd recording mode which makes one frame said truck N book (integer with N smaller than M). As opposed to the tape medium by which the recording-mode code which shows the recording mode of the pilot signal for tracking which circulates by said L trucks (L is four or more integers), and said truck to said truck is recorded In insert editing which rewrites predetermined fields other than the 1st [of said truck] field It is the magnetic recorder and reproducing device which performs tracking control based on said pilot signal which leaks from said 1st field of the adjoining truck of a horizontal-scanning truck while the magnetic head scans said 1st field. A comparison means to perform the comparison with the criteria recording-mode code which accompanies an insert-editing information signal at the time of said insert editing, and the reproduced recording-mode code which is obtained by the scan of fields other than an insert-editing field, When the output of said comparison means is answered and said criteria recording-mode code and said reproduced recording-mode code shift, it is characterized by providing an insertion interruption means to terminate said insert editing.

[0010]

[Function] Since the recording-mode code which shows the recording mode of a self-truck to a truck is recorded according to this invention, the criteria recording-mode code which accompanies an edit information signal also in the time of insert editing is compared with the reproduced recording-mode code which is obtained by a scan and playback of a non-insert-editing field, and insert editing can be terminated when a criteria recording-mode code and the reproduced recording-mode code shift. Consequently, insert editing of the truck which is a low-speed rate or was recorded at the low-speed rate in the truck by which high-speed rate record was carried out is not carried out at a high-speed rate.

[0011]

[Example] Hereafter, the 1st example of the magnetic recorder and reproducing device of this invention is explained, referring to a drawing.

[0012] (Drawing 1) is the block diagram of the magnetic recorder and reproducing device in the 1st example of this invention, and shows the principle of operation at the time of insert editing. The head with which 1a and 1b were attached in the rotating cylinder (not shown), and 20a-20e are the trucks formed on the tape 8, respectively. As for a band-pass filter, and 4a and 4b, a difference circuit and 6 are capstan control circuits, and AM detector circuit and 5 control [3a and 3b] the capstan motor 7. 9 is a reel which rolls round a tape 8. Furthermore, a positioning signal detection means for 11 to detect the positioning signal of the ITI field of the truck mentioned later, The timing generation circuit which 12 answers the positioning signal detection means 11, and generates a pilot signal sample signal and an edit

timing signal, The edit transfer switch which 13 answers an edit timing signal from the timing generation circuit 12, and changes the mode of equipment from playback to record, A recording-mode code comparison means to compare the reproduced recording-mode code which 30 mentions later with the criteria recording-mode code which accompanies an edit information signal, 31 is an insert-editing interruption means to answer a signal from the recording-mode code comparison means 30, and to send a command signal to the capstan control circuit 6.

[0013] An example of the head arrangement carried in the cylinder used for this invention by (drawing 2) is shown. 10 is a cylinder in which a head is carried. And as shown in drawing, on the cylinder 10, the pair heads 1a, 1b, and 2a and 2b counter 180 degrees, and are carried, and it is the configuration that record playback of the two trucks is carried out by each pair head on a tape 8 at abbreviation coincidence.

[0014] The magnetic recorder and reproducing device of this example has two recording modes. They are the low-speed recording mode which carries out record playback of the NTSC signal, and the high-speed recording mode which carries out record playback of the HDTV signal. The item in each mode is shown in (a table 1). A track pitch presupposes that it is fixed irrespective of a recording mode. Delivery speed of a tape is made into twice a low-speed recording mode in a high-speed recording mode. An activity head performs record playback by the low-speed recording mode to using all the heads shown in (drawing 2) at a high-speed recording mode only using 1 set of pair heads 1a and 1b. Moreover, one frame (the amount of master data which builds one screen) is 20 trucks, and is constituted from a low-speed recording mode by ten trucks at a high-speed recording mode. The recording-mode code mentioned later is set to "10" by "01" and the low-speed recording mode at a high-speed recording mode.

[0015]

[A table 1]

	高速記録モード	低速記録モード
トラックピッチ(μm)	10	10
テープスピード(mm/s)	44	22
使用ヘッド	1a,1b,1c,1d	1a,1b
1フレームトラック数(本)	20	10
記録モードコード (バイナリー)	01	10

[0016] The truck block diagram in one example of this invention is shown in (drawing 3). The insertion information field where the positioning information signal for positioning an editing point when it is classified from a gap G1 by G3 in a truck and insert editing is performed from a head was embedded (ITI field), Four fields of the sub-code field (SUBCODE field) where information, such as an audio range (AUDIO field) on which the sound signal was recorded, a video field (VIDEO field) where the video signal was recorded, and a time code of each truck, was recorded are formed at the time of record. Moreover, the interior of each field of the audio in a truck, video, and a sub-code is divided into the segment, and digital recording of a synchronizing signal (Sync), live data, and the correction signal is carried out to each segment.

[0017] Moreover, in the top ITI field, multiplex record of the pilot signal for performing tracking control with a positioning information signal at the time of insert editing is carried out (digital multiplex record is included). In this case, the example on which two kinds of pilot signals recorded on different frequencies f1 and f2 are recorded by turns every one truck is shown. Generally 1-4 kinds of frequencies of an information signal and the low frequency in which it does not interfere are chosen, and this pilot signal is changed one by one, and is recorded.

[0018] The recording-mode code to show the recording mode of a self-truck is further recorded on a part

of ITI field. In this example, the case where a truck is recorded by the high-speed recording mode is shown, and, as for the recording-mode code, "01" is recorded.

[0019] Thus, it explains, referring to about the actuation at the time of insert editing which rerecords an information signal from a top in the formed truck (drawing 1) (drawing 4). (Drawing 4) is timing-chart drawing at the time of insert editing in the example of the magnetic recorder and reproducing device of this invention.

[0020] The case where head 1a carries out insert editing of the information signal currently recorded on truck 20d now is considered. In (drawing 1), in the ITI field of a truck 20d head, it connects with terminal 13b and changes a switch 13 into the playback condition of receiving the signal from head 1a. Since the leak component of different pilot signal components f1 and f2 currently recorded on the ITI field of the truck 20d next trucks 20c and 20e is contained in the output from head 1a at this time, relative-position relation with the truck expected a head can be known by measuring those amounts. That is, f1 and f2 component which were detected with band-pass filters 3a and 3b are changed into the dc component according to the level by the AM detector circuits 4a and 4b, and are compared by the difference circuit 5, respectively. The output of a difference circuit 5 has become a relative-position error (head 1a and truck 20d which it is going to reproduce), i.e., a tracking-error signal. On the other hand, the signal from head 1a is independently inputted also into the positioning signal detection means 11, and when the positioning information signal currently recorded in the ITI field is detected, the truck location reference signal shown in (drawing 4 (b)) is acquired. This truck location reference signal is sent to the timing generation circuit 12, and the pilot sample signal which shows the timing which carries out the sample of the tracking-error signal as shown based on a truck location reference signal (drawing 4 (c)) is generated in the timing generation circuit 12. The tracking-error signal by which the sample was carried out with the sampler 14 based on this pilot sample signal is inputted into the capstan control circuit 6, operates the capstan motor 7, and controls delivery of a tape to come to the middle whose head 1a is truck 20d.

[0021] Moreover, in the timing generation circuit 12, the edit timing signal which shows the location of an insert-editing field as shown for making it be the same as that of a pilot sample signal (drawing 4 (d)) is also generated. The example of this drawing is an edit timing signal in case an insert-editing field is a VIDEO field. Only when this edit timing signal is 'H', a switch 13 is changed from terminal 13b to terminal 13a, a new information signal is added to head 1a, and the information signal currently recorded on the video field is rewritten by the new information signal. Moreover, it is rewritten almost simultaneous [two trucks] by the information signal with the new information signal currently recorded on the video field since another new information signal is added also to head 1b with a changeover switch (not shown) at the same time a switch 13 is switched to terminal 13 from terminal 13b a by the timing signal made by the timing generation circuit 12 and a new information signal is added to head 1a. Moreover, since head 1b is arranged very much with head 1a in near and relative-position relation with head 1a can be secured to accuracy, the tracking of head 1b and truck 20c can also be simultaneously attained by performing head 1a and truck 20d tracking.

[0022] While insert editing is performed as mentioned above, the reproduced recording-mode code which is obtained by playback of the 1st truck 20d field and the criteria recording-mode code sent along with an edit information signal are inputted and compared with the recording-mode code comparison means 30. When the recording-mode code reproduced on this truck and the criteria recording-mode code incidental to the edit information signal shift, the recording mode of the signal which is going to carry out insert editing will have shifted to the recording mode and truck of the truck under scan, and it becomes unsuitable insertion actuation. Then, when the recording-mode code reproduced on the truck and the criteria recording-mode code incidental to the edit information signal shift, the recording-mode code comparison means 30 sends a signal to the insert-editing interruption means 31. An insert-editing interruption means 31 by which the signal from the recording-mode code comparison means 30 was received gives an instruction immediately to the capstan control circuit 6, and interrupts insert-editing actuation.

[0023] In addition, the insert-editing interruption means 31 can be transposed to a warning means. In

this case, a carrier beam warning means outputs an alarm signal outside for the signal of "the recording mode having shifted" from the recording-mode code comparison means 30, and that is transmitted to a user (a display, voice output, etc.).

[0024] Next, the 2nd example of this invention is explained using (drawing 5). (Drawing 5) is the block diagram of the truck in the 2nd example of this invention. As shown in (drawing 5), in the 2nd example, the recording-mode code which shows record of a truck is recorded on a part of not an ITI field but AUDIO field, VIDEO field, and each SUBCODE field. the 2nd example -- the 1st example -- comparing -- the configurations of a truck only differ -- it is -- the block diagram of operation at the time of insert editing, and the head arrangement on a cylinder -- the 1st example -- having been shown (drawing 2 (drawing 1)) -- being the same .

[0025] The actuation at the time of insert editing at the time of using this truck configuration for below is explained. Since it is completely the same as that of the 1st example, the tracking control using the pilot signal of the ITI field in insert editing and decision actuation of the insert-editing point using the positioning signal of an ITI field are not explained.

[0026] Since it differs from the 1st example, actuation of the recording-mode code comparison means 30 shown in (drawing 1) and the insert-editing interruption means 31 is explained. In addition, in this explanation, a VIDEO field shall be edited like explanation of the 1st example. While insert editing of a VIDEO field is performed, the reproduced recording-mode code which is obtained by playback of the field (in this case, an AUDIO field is used) which is not edited and the criteria recording-mode code sent along with an edit information signal are inputted and compared with the recording-mode code comparison means 30. When the recording-mode code reproduced on this truck and the criteria recording-mode code incidental to the edit information signal shift, the recording mode of the truck under scan and the recording mode of the signal which is going to carry out insert editing to that truck will have shifted, and it becomes unsuitable insertion actuation. Then, when the recording-mode code reproduced on the truck and the criteria recording-mode code incidental to the edit information signal shift, the recording-mode code comparison means 30 sends a signal to the insert-editing interruption means 31. An insert-editing interruption means 31 by which the signal from the recording-mode code comparison means 30 was received gives an instruction immediately to the capstan control circuit 6, and interrupts insert-editing actuation.

[0027] When carrying out insert editing of the AUDIO field, a recording-mode code is obtained from playback of a VIDEO field or a SUBCODE field. A recording-mode code is obtained from playback of the field which is not edited similarly in other case.

[0028] When rewriting all the fields of AUDIO, VIDEO, and SUBCODE, a recording-mode code is not obtained. However, since all live data will be rewritten in this case, some same trucks do not become data with which records differ, and it is satisfactory.

[0029] In addition, the insert-editing interruption means 31 can be transposed to a warning means completely like the case of the 1st example. In this case, a carrier beam warning means outputs an alarm signal outside for the signal of "the recording mode having shifted" from the recording-mode code comparison means 30, and that is transmitted to a user (a display, voice output, etc.).

[0030] Since the recording-mode code which shows record of a self-truck to a truck is recorded as mentioned above according to this example, the comparison with the criteria recording-mode code which accompanies an edit information signal also in the time of insert editing, and the reproduced recording-mode code which is obtained by a scan and playback of a non-insert-editing field is performed, and insert editing can be terminated when a criteria recording-mode code and the reproduced recording-mode code shift. Consequently, insert editing of the truck which is a low-speed rate or was recorded at the low-speed rate in the truck by which high-speed rate record was carried out is not carried out at a high-speed rate.

[0031] Moreover, if an alarm signal is taken out when a criteria recording-mode code and the reproduced recording-mode code shift, it can check externally that it is insert editing from which record shifts in a truck.

[0032] In addition, although the example in two-channel simultaneous record was shown in this

example, the combination of a head and arrangement are not limited to this example, but, in other cases, can be applied similarly.

[0033] Moreover, how to attach a recording-mode code is not limited to how to have explained by this example, but can be set as arbitration.

[0034] Moreover, although the pilot signal for tracking showed two kinds of cases in this example, a pilot signal of four kinds of frequencies which is used by 8mm video may be used, and it is not limited to how to put in a pilot signal.

[0035] Moreover, it does not matter even if the way of putting is not limited to this example but detects coincidence of a digital pattern also in a positioning information signal.

[0036]

[Effect of the Invention] Since the recording-mode code the magnetic recorder and reproducing device of this invention indicates record of a self-truck to be to a truck as mentioned above has been recorded, the comparison with the criteria recording-mode code which accompanies an edit information signal also in the time of insert editing, and the reproduced recording-mode code which is obtained by a scan and playback of a non-insert-editing field is performed, and when a criteria recording-mode code and the reproduced recording-mode code shift, it becomes possible to terminate insert editing. Therefore, insert editing of the truck which is a low-speed rate or was recorded at the low-speed rate in the truck by which high-speed rate record was carried out is not carried out at a high-speed rate.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The block diagram showing the principle of operation at the time of insert editing of the magnetic recorder and reproducing device in the 1st example of this invention

[Drawing 2] Drawing showing an example of head arrangement of the cylinder used for this invention

[Drawing 3] The truck block diagram in the 1st example of this invention

[Drawing 4] Drawing showing the timing of each part signal at the time of insert editing of the magnetic recorder and reproducing device in the 1st example of this invention

[Drawing 5] The block diagram of the truck in the 2nd example of this invention

[Drawing 6] The truck block diagram in the conventional magnetic recorder and reproducing device

[Description of Notations]

1a, 1b Head

3a, 3b Band-pass filter

4a, 4b AM detector circuit

5 Difference Circuit

6 Capstan Control Circuit

8 Tape

9 Reel

13 Edit Transfer Switch

20a-20e Truck

30 Recording-Mode Code Comparison Means

31 Insert-Editing Interruption Means

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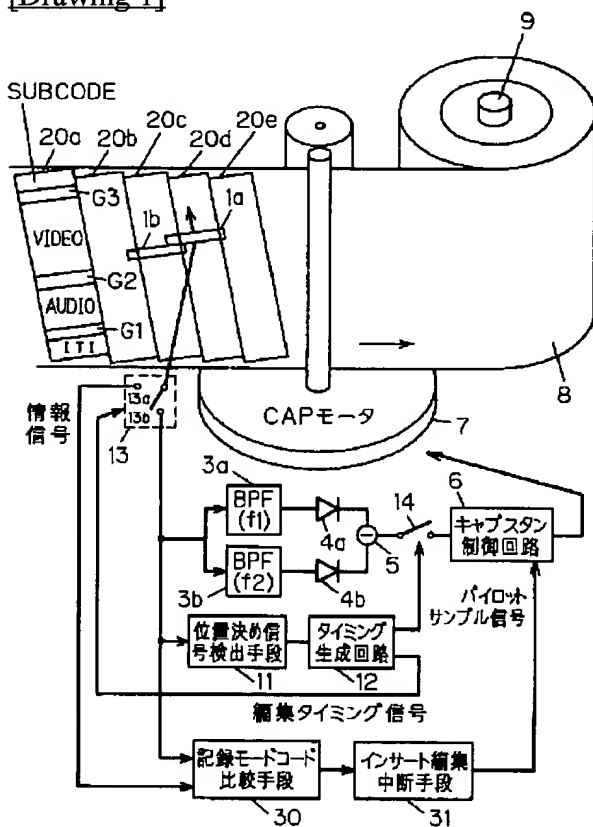
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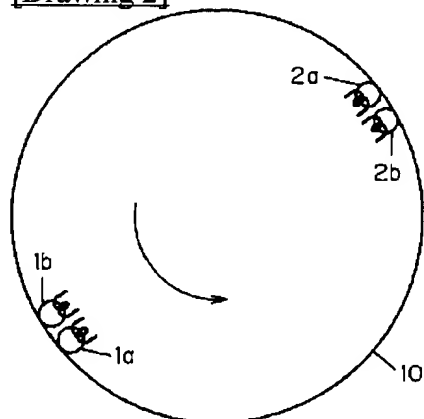
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DRAWINGS

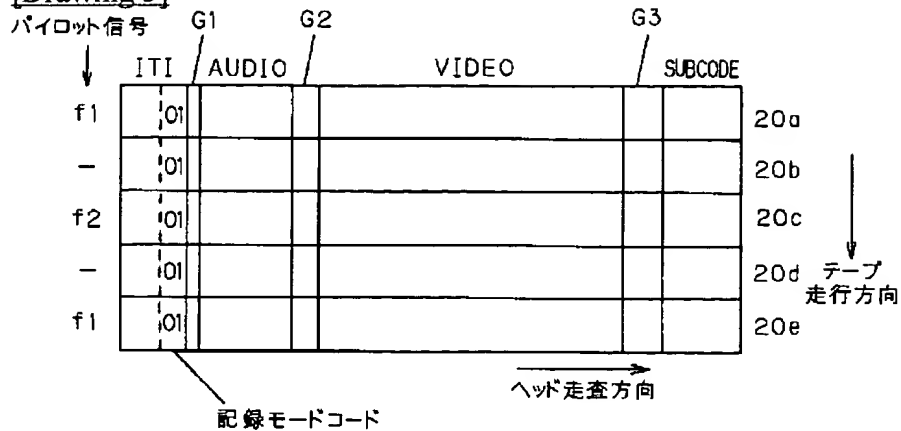
[Drawing 1]



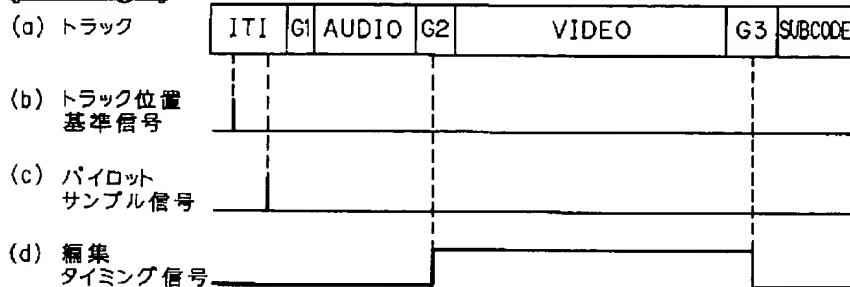
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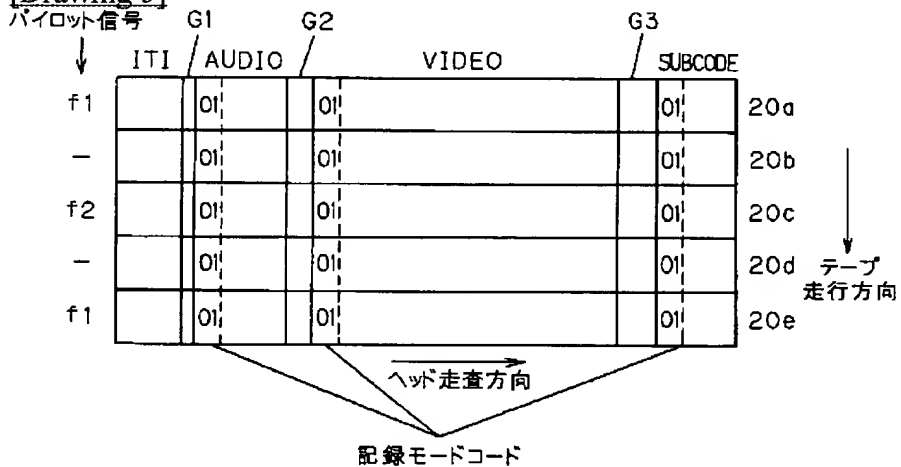
[Drawing 3]



[Drawing 4]

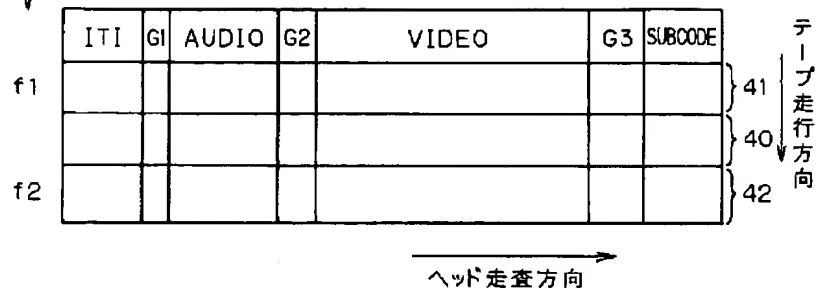


[Drawing 5]



[Drawing 6]

パイロット信号



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